

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

IN THE CLAIMS:

Please amend claims 1-28 and add new claims 29-36 as indicated in the following Listing of Claims.

LISTING OF CLAIMS

1 1. (Currently amended) An antifriction bearing with integrated
2 lubricating material for lubricating parts that move
3 relative to each other, in particular with a respective
4 inner ring that exhibits a running path and an outer ring,
5 between which rolling bodies, in particular bearing balls,
6 are arranged, ~~characterized in that~~ wherein the improvement
7 comprises at least a part of the surface of at least one of
8 the parts ~~exhibits~~ includes a coating (52, 53) of lubricant.

1 2. (Currently amended) The antifriction bearing according to
2 Claim 1, ~~characterized in that~~ wherein one of the parts is a
3 high pressure ball bearing having $n \cdot D_m \geq 1$ mill. (n = speed

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

1 [RPM], D_m = reference circle [mm]).

1 3. (Currently amended) The antifriction bearing according to
2 Claim 1 or 2, ~~characterized in that~~ wherein the lubricant is
3 ~~designed in such a way as to be~~ conveyed from the part
4 carrying the coating to ~~the~~ an uncoated part as the parts
5 move.

1 4. (Currently amended) The antifriction bearing according to
2 ~~one of~~ Claim 1 or 3, ~~characterized in that~~ 2 wherein the
3 lubricant and ~~the~~ a counter-surface (57) of ~~the~~ an uncoated
4 part (54) are designed ~~in such a way~~ that the lubricant
5 adheres to ~~the~~ a counter-surface of the uncoated part (54).

1 5. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 4,~~ Claim 1 wherein
3 the coating exhibits a varying composition (52a, 52b, 53,
4 42, 43, 44) from ~~the~~ a side of ~~the~~ a component to be coated

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

1 toward ~~the~~ a free surface.

1 6. (Currently amended) The antifriction bearing according to
2 ~~one of the preceding claims, characterized in that the Claim~~
3 1 wherein an amount of lubricant on ~~the~~ a free surface of
4 the coating (55) is increased with respect to the side of
5 the component to be coated.

1 7. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 6, characterized in that Claim 1 wherein~~
3 the coating ~~encompasses~~ includes at least a carrier layer
4 (52a, 42) ~~connected with~~ on the surface of the coated part,
5 and at least one lubricant layer (53, 43, 44).

1 8. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 7, characterized in that Claim 1 wherein~~
3 the lubricant from the coating (53, 44) is a solid
4 lubricant.

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

1 9. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 8, characterized in that~~ Claim 1 wherein
3 the lubricant has constituents incorporated into the coating
4 (53, 44) that assume a liquid state during operation.

1 10. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 9, characterized in that~~ Claim 1 wherein
3 the coating (53, 44) ~~encompasses~~ includes a metal-doped,
4 diamond-like carbon layer DCL.

1 11. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 10, characterized in that~~ Claim 1 wherein
3 the coating ~~encompasses~~ includes a single or multi-sheet
4 polymer layer (42, 43, 44).

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

1 12. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 11, characterized in that the Claim 1~~
3 ~~further comprising a metallic~~ carrier layer (42, 52a) ~~is~~
4 ~~metallic.~~

1 13. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 12, characterized in that the entire~~
3 ~~Claim 1 wherein the~~ coating has additional functional layers
4 (52a, 52b, 42, 43), of which one is pressure-stabilizing.

1 14. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 13, characterized in that Claim 1 wherein~~
3 one or more layers of the coating have internal dampening.

1 15. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 14, characterized in that the Claim 1~~
3 ~~wherein~~ electrical resistance of the coating is altered by

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

1 16. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 15, characterized in that one~~ Claim 1
3 wherein said coating includes several layers and one of the
4 several layers has an electrically insulating effect.

1 17. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 16, characterized in that~~ Claim 1 wherein
3 the coating differs visually from the ~~basic~~ substrate
4 material (51, 41).

1 18. (Currently amended) The antifriction bearing according to
2 ~~Claim 17, characterized in that the~~ Claim 1 wherein visual
3 properties of the coating are altered by wear.

1 19. (Currently amended) The antifriction bearing according to

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

1 ~~one of Claims 1 to 18, characterized in that~~ Claim 1 wherein
2 the coating causes the surface hardness of the coating to
3 decrease or remain unchanged.

1 20. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 19, characterized in that~~ Claim 1 wherein
3 at least one component of an antifriction bearing is
4 provided with a corresponding coating.

1 21. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 20, characterized in that~~ Claim 1 wherein
3 at least one component of a sliding bearing is provided with
4 a coating.

1 22. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 21, characterized in that~~ Claim 1 wherein
3 an additional lubricant is provided exclusively on the
4 contacting surfaces of the parts.

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

1 23. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 22, characterized in that~~ Claim 22
3 wherein the additional lubricant has high adhesive and
4 cohesive forces.

1 24. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 23, characterized in that~~ Claim 1 wherein
3 an additional, second unbound lubricant is present.

1 25. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 24, characterized in that~~ Claim 1 wherein
3 the lubricant is designed as a carrier for the lubricant(s).

1 26. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 25, characterized in that~~ Claim 1 wherein
3 the coating ~~and/or the~~ additional lubricants can be
4 sterilized.

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

1 27. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 26, characterized in that Claim 1 wherein~~
3 the lubricant of the coating (53, 44) ~~and/or the additional~~
4 lubricant are ~~selected in such a way as to be~~ compatible
5 with a prior art lubricant ~~according to prior art.~~

1 28. (Currently amended) The antifriction bearing according to
2 ~~one of Claims 1 to 27, characterized in that the lubricants~~
3 ~~consist~~ Claim 1 wherein the lubricant consists of several
4 layers.

1 29. (New) A self lubricating antifriction device comprising:
2 (a) a first uncoated substrate material forming a
3 bearing, a ball, a roller or a bearing cage;
4 (b) a second coated substrate material forming a
5 bearing, a ball, a roller or a bearing cage disposed at an
6 operable distance from said first uncoated substrate

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

1 material; and
2 (c) a dry lubricating functional coating disposed on
3 said second coated part to form said second coated substrate
4 material and to lubricate said first uncoated substrate
5 material and said second coated substrate material.

1 30. (New) The self lubricating antifriction device of claim 29
2 wherein said dry lubricating functional coating is a
3 lamellar form of modified tungsten disulfide.

1 31. (New) The self lubricating antifriction device of claim 29
2 wherein said dry lubricating layer is a metal-doped diamond-
3 like carbon layer (DCL).

1 32. (New) The self lubricating antifriction device of claim 29
2 wherein said dry lubricating layer is PTFE.

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

1 33. (New) The self lubricating antifriction device of claim 29
2 further comprising an intermediate layer disposed between
3 said second coated substrate material and said dry
4 lubricating functional coating.

1 34. (New) The self lubricating antifriction device of claim 33
2 wherein said intermediate layer is a chrome layer.

1 35. (New) The self lubricating antifriction device of claim 34
2 wherein said chrome layer includes at least one lamellar
3 WC/C layer.

1 36. (New) A self lubricating antifriction bearing apparatus
2 comprising:
3 (a) a bearing having an inner ring, an outer ring and
4 bearings disposed intermediate said inner ring and said
5 outer ring;
6 (b) a dry lubricating coating disposed on at least one

MARTIN ENGLER,
EDMUND FOEHR and
WALTER SCHUMACHER-RUF
Serial No.: 10/539,305

1 part of said inner ring, said outer ring or said bearings to
2 form a functional layer for supplying lubricant to remaining
3 parts of said inner ring, said outer ring and said bearings;
4 and
5 (c) an intermediate layer comprising a transitional
6 layer or a support layer disposed intermediate said dry
7 lubricating coating and said at least one part of said inner
8 ring, said outer ring or said bearing wherein said
9 functional layer and said intermediate layer have a combined
10 coating thickness of about 1 to 10 μm .